



Horizon Project

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# NMC Horizon Project Preview

## 2013 Higher Education Edition

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## Time-to-Adoption: One Year or Less

### Massively Open Online Courses

When Stephen Downes and George Siemens coined the term in 2008, massively open online courses (MOOCs) were conceptualized as the next evolution of networked learning. The essence of the original MOOC concept was a web course that people could take from anywhere across the world, with potentially thousands of participants. The basis of this concept is an expansive and diverse set of content, contributed by a variety of experts, educators, and instructors in a specific field, aggregated into a central repository, such as a web site. What made this content set especially unique is that it could be “remixed” — the materials are not necessarily designed to go together but become associated with each other through the MOOC. A key component of the original vision is that all course materials and the course itself are open source and free — with the door left open for a fee if a participant taking the course wished university credit to be transcribed for the work. Since those early days, interest in MOOCs has evolved at an unprecedented pace, fueled by high profile entrants like Coursera, Udacity, and edX. In these examples, the notion has shifted away from open content or even open access, to an interpretation in which “open” equates to “no charge.” The pace of development in the MOOC space is so high that it is likely that a number of alternative models will emerge in the coming year. Ultimately, the models that attract the most participants are gaining the most attention, but many challenges remain to be resolved in supporting learning at scale.

### Tablet Computing

In the past two years, advances in tablets have captured the imagination of educators around the world. Led by the incredible success of the iPad, which at the time of publication had sold more than 85 million units and is predicted by GigaOM to sell over 377 million units by 2016, other similar devices such as the Samsung Galaxy Nexus, Kindle Fire, the Nook, Sony's Tablet S, and the Microsoft Surface have also entered this rapidly growing market. In the process, the tablet (a form that does not require a mouse or keyboard) has come to be viewed as a new technology in its own right, one that blends features of laptops, smartphones, and earlier tablet computers with always-connected Internet, and thousands of apps with which to personalize the experience. As these new devices have become more used and understood, it has become even clearer that they are independent and distinct from other mobile devices such as smartphones, e-readers, or tablet PCs. With significantly larger screens and richer gesture-based interfaces than their smartphone predecessors — and a growing and ever more competitive market — they are ideal tools for sharing content, videos, images, and presentations because they are easy for anyone to use, visually compelling, and highly portable.

## **Time-to-Adoption: Two to Three Years**

### **Big Data and Learning Analytics**

Big Data and learning analytics refers to the interpretation of a wide range of data produced by and gathered on behalf of students to assess academic progress, predict future performance, and spot potential issues. Data are collected from explicit student actions, such as completing assignments and taking exams, and from tacit actions, including online social interactions, extracurricular activities, posts on discussion forums, and other activities that are not typically viewed as part of a student's work. The goal of learning analytics is to enable teachers and schools to tailor educational opportunities to each student's level of need and ability. Learning analytics promises to harness the power of advances in data mining, interpretation, and modeling to improve understanding of teaching and learning, and to tailor education to individual students more effectively. Still in its early stages, learning analytics is an emerging scientific practice that hopes to redefine what we know about learning by mining the vast amount of data produced by students in academic activities.

### **Game-Based Learning**

Game-based learning refers to the integration of games or gaming mechanics into educational experiences. This topic has gained considerable traction over the past decade as games have proven to be effective learning tools, and beneficial in cognitive development and the fostering of soft skills among learners, such as collaboration, communication, problem-solving, and critical thinking. The forms of games grow increasingly diverse and some of the most commonly used for educational purposes include alternate reality games (ARG), massively multiplayer online games (MMO), and global social awareness games. Most games that are currently used for learning across a wide range of disciplines share similar qualities: they are goal-oriented; have strong social components; and simulate some sort of real world experience that people find relevant to their lives. As game-based learning garners more attention, developers are responding with games expressly designed to support immersive, experiential learning.

## **Time-to-Adoption: Four to Five Years**

### **3D Printing**

Known in industrial circles as rapid prototyping, 3D printing refers to technologies that construct physical objects from three-dimensional (3D) digital content such as computer-aided design (CAD), computer aided tomography (CAT), and X-ray crystallography. A 3D printer builds a tangible model or prototype from the file, one layer at a time, using an inkjet-like process to spray a bonding agent onto a very thin layer of fixable powder. The bonding agent can be applied very accurately to build an object from the bottom up, layer by layer. The process even accommodates moving parts within the object. Using different powders and bonding agents, color can be applied, and prototype parts can be rendered in plastic, resin, or metal. This technology is commonly used in manufacturing to build prototypes of almost any object (scaled to fit the printer, of course) — models, plastic and metal parts, or any object that can be described in three dimensions.

### **Wearable Technology**

Wearable technology refers to devices that can be worn by users, taking the form of an accessory such as jewelry, sunglasses, a backpack, or even actual items of clothing like shoes or a jacket. The benefit of wearable technology is that it can conveniently integrate tools, devices, power needs, and connectivity within a user's everyday life and movements. Google's Project Glass features one of the most talked about current examples — the device resembles a pair of glasses but with a single lens. A user can see information about their surroundings displayed in front of them, such as the names of friends who are in close proximity, or nearby places to access data that would be relevant to a research project. Wearable technology is still very new, but one can easily imagine accessories such as gloves that enhance the user's ability to feel or control something they are not directly touching. Wearable technology already in the market includes clothing that charges batteries via decorative solar cells, allows interactions with a user's devices via sewn-in controls or touch pads, or collects data on a person's exercise regimen from sensors embedded in the heels of their shoes.

## Key Trends

**The abundance of resources and relationships made easily accessible via the Internet is increasingly challenging us to revisit our roles as educators.** Institutions must consider the unique value that each adds to a world in which information is everywhere. In such a world, sense-making and the ability to assess the credibility of information are paramount. Mentoring and preparing students for the world in which they will live and work is again at the forefront. Universities have always been seen as the gold standard for educational credentialing, but emerging certification programs from other sources are eroding the value of that mission daily.

**Both formal and informal learning experiences are becoming increasingly important as college graduates continue to face a highly competitive workforce.** Informal learning generally refers to any learning that takes place outside of a formal school setting, but a more practical definition may be learning that is self-directed and aligns with the student's own personal learning goals. Employers have specific expectations for new hires, including communication and critical thinking skills — talents that are often acquired or enhanced through informal learning. Online or other modern environments are trying to leverage both formal and informal learning experiences by giving students more traditional assignments, such as textbook readings and paper writing, in addition to allowing for more open-ended, unstructured time where they are encouraged to experiment, play, and explore topics based on their own motivations. This type of learning will become increasingly important in learning environments of all kinds.

**Education paradigms are shifting to include online learning, hybrid learning, and collaborative models.** Budget cuts have forced institutions to re-evaluate their education strategies and find alternatives to the exclusive face-to-face learning models. Students already spend much of their free time on the Internet, learning and exchanging new information — often via their social networks. Institutions that embrace face-to-face/online hybrid learning models have the potential to leverage the online skills learners have already developed independent of academia. We are beginning to see developments in online learning that offer different affordances than physical campuses, including opportunities for increased collaboration while equipping students with stronger digital skills. Hybrid models, when designed and implemented successfully, enable students to travel to campus for some activities, while using the network for others, taking advantage of the best of both environments.

**Massively open online courses are proliferating.** Led by the successful early experiments of world-class institutions (like MIT and Stanford), MOOCs have captured the imagination of senior administrators and trustees like few other educational innovations have. High profile offerings are being assembled under the banner of institutional efforts like edX, and large-scale collaborations like Coursera and the Code Academy. As the ideas evolve, MOOCs are increasingly seen as a very intriguing alternative to credit-based instruction. The prospect of a single course achieving enrollments in the tens of thousands is bringing serious conversations on topics like micro-credit to the highest levels of institutional leadership.

**Open is a key trend in future education and publication, specifically in terms of open content, open educational resources, massively open online courses, and open access.** As “open” continues its diffusion as a buzzword in education, it is increasingly important to understand the definition. Often mistakenly equated only with “free,” open education advocates are working towards a common vision that defines “open” as free, attributable, and without any barriers.

**There is an increasing interest in using data for personalizing the learning experience and for performance measures.** As learners participate in online activities, they leave a vast trace of data that

can be mined for a range of purposes. In some instances, the data is used for intervention, enrichment, or extension of the learning experience. This can be made available to instructors and learners as dashboards so that student progress can be monitored. In other cases, the data is made available to appropriate audiences for measuring students' academic performance. As this field matures, the hope is that this information will be used to continually improve learning outcomes.

## Significant Challenges

**Appropriate metrics of evaluation lag the emergence of new scholarly forms of authoring, publishing, and researching.** Traditional approaches to scholarly evaluation such as citation-based metrics, for example, are often hard to apply to research that is disseminated or conducted via social media. New forms of peer review and approval, such as reader ratings, inclusion in and mention by influential blogs, tagging, incoming links, and re-tweeting, are arising from the natural actions of the global community of educators, with increasingly relevant and interesting results. These forms of scholarly corroboration are not yet well understood by mainstream faculty and academic decision makers, creating a gap between what is possible and what is acceptable.

**The demand for personalized learning is not adequately supported by current technology or practices.** The increasing demand for education that is customized to each student's unique needs is driving the development of new technologies that provide more learner choice and control and allow for differentiated instruction. It has become clear that one-size-fits-all teaching methods are neither effective nor acceptable for today's diverse students. Technology can and should support individual choices about access to materials and expertise, amount and type of educational content, and methods of teaching.

**Faculty training still does not acknowledge the fact that digital media literacy continues its rise in importance as a key skill in every discipline and profession.** Despite the widespread agreement on the importance of digital media literacy, training in the supporting skills and techniques is rare in teacher education and non-existent in the preparation of faculty. As lecturers and professors begin to realize that they are limiting their students by not helping them to develop and use digital media literacy skills across the curriculum, the lack of formal training is being offset through professional development or informal learning, but we are far from seeing digital media literacy as a norm. This challenge is exacerbated by the fact that digital literacy is less about tools and more about thinking, and thus skills and standards based on tools and platforms have proven to be somewhat ephemeral.

**Economic pressures and new models of education are bringing unprecedented competition to the traditional models of tertiary education.** Across the board, institutions are looking for ways to control costs while still providing a high quality of service. Institutions are challenged by the need to support a steady — or growing — number of students with fewer resources and staff than before. As a result, creative institutions are developing new models to serve students. Simply capitalizing on new technology, however, is not enough; the new models must use these tools and services to engage students on a deeper level.

**Institutional barriers present formidable challenges to moving forward in a constructive way with emerging technologies.** Too often it is education's own processes and practices that limit broader uptake of new technologies. Much resistance to change is simply comfort with the status quo, but in other cases, such as in promotion and tenure reviews, experimentation or innovative applications of technologies is often seen as outside the role of researcher or scientist.

**Most academics are not using new and compelling technologies for learning and teaching, nor for organizing their own research.** Many researchers have not had training in basic digitally supported teaching techniques, and most do not participate in the sorts of professional development opportunities that would provide them. This is due to several factors, including a lack of time, a lack of expectations that they should, and the lack of infrastructure to support the training. Academic research facilities rarely have the proper processes set up to accommodate this sort of professional development; many think a cultural shift will be required before we see widespread use of more



innovative organizational technology. Many caution that as this unfolds, the focus should not be on the technologies themselves, but on the pedagogies that make them useful.

